Study shows success of New York City's Clean Heat Program

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In 2012, New York City established the Clean Heat Program to eliminate the use of residual heating oil which had been identified as a major source of air pollution in the City and linked to multiple adverse

health outcomes, including cardiovascular disease. In a study conducted at Columbia University Mailman School of Public Health with colleagues at Drexel University, researchers evaluated the program outcomes, including the air pollution reductions between 2012 and 2016, using multiple data sources and rigorous model diagnostics.

The results showed that the heating oil #6 ban (completed by 2016) was effective in reducing air pollution. The study is the first to provide a framework to evaluate the impact of the Clean Heat Program since it was implemented. The findings are published in the journal *Environmental Health Perspectives.*

"It is very encouraging to see the overall success of the Clean Heat Program in reducing pollution levels in the City, and particularly exciting to find that the policy is effective in both low- and high-income neighborhoods." said lead author Mike He, Ph.D., formerly a Columbia Mailman School doctoral candidate in the Department of Environmental Health Sciences and now a postdoctoral fellow in the Department of Medicine and Public Health at the Icahn School of Medicine at Mount Sinai.

Prior to implementing the new policy, three types of heating oil were used in NYC: heating oil #6, #4, and ultra-low sulfur oil #2. Both #6 and #4 are referred to as residual heating oils. Oil #2, which is the lightest of the three, has been considered a cleaner energy alternative, and any newly installed boilers would have to burn at this lower-polluting grade after the Clean Heat Program came into effect.

The researchers used census tract-level data and air pollution data from the New York City Community Air Survey (NYCCAS), a large urban air monitoring program that measures levels of numerous air pollutants across NYC using monitoring units placed throughout the city to estimate air pollution levels, information from which is subsequently

used to build highly accurate and finely spatially resolved pollutant prediction surfaces. Because building fuel conversion began in 2012, the investigators selected the years 2011 and 2016—when #6 was banned—to estimate the pre- vs. post-policy difference in pollutant concentrations.

The researchers observed substantial reductions in the three air pollutants studied—fine particles, $PM_{2.5}$; nitrogen dioxide, NO_2; and sulfur dioxide, SO_2—attributable to the ban of oil #6. These reductions were independent of other sources of air pollution in the City, such as traffic and neighborhood-level socioeconomic conditions.

"Given the well-established associations of SO_2, $PM_{2.5}$, and NO_2 with numerous adverse health outcomes, the reductions in these air pollutants are likely to result in several potential health benefits and in general improve population health outcomes in New York City," said Marianthi-Anna Kioumourtzoglou, ScD, Columbia Mailman School assistant professor of Environmental Health Sciences and senior author.

More information: Evaluating the Impact of the Clean Heat Program on Air Pollution Levels in New York City, *Environmental Health Perspectives* (2021). DOI: 10.1289/EHP9976

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